

Abstract

2 A tomographic reconstruction method and system incorporating
Bayesian estimation techniques to inspect and classify regions of imaged
4 objects, especially objects of the type typically found in linear, areal, or 3-
dimensional arrays. The method and system requires a highly
6 constrained model M that incorporates prior information about the object
or objects to be imaged, a set of prior probabilities $P(M)$ of possible
8 instances of the object; a forward map that calculates the probability
density $P(D|M)$, and a set of projections D of the object. Using Bayesian
10 estimation, the posterior probability $p(M|D)$ is calculated and an estimated
model M_{EST} of the imaged object is generated. Classification of the
12 imaged object into one of a plurality of classifications may be performed
based on the estimated model M_{EST} , the posterior probability $p(M|D)$ or
14 MAP function, or calculated expectation values of features of interest of
the object.